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DEVELOPMENT, TESTING, AND EVALUATION OF A PROGRAMED METHOD FOR THE TEACHING OF I.P.A. TRANSCRIPTION. FINAL REPORT.

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DESCRIPTORS- *PHONETIC TRANSCRIPTION, *PROGRAMED INSTRUCTION, COLLEGE INSTRUCTION, TAPE RECORDINGS, AUDITORY DISCRIMINATION, ENGLISH, IPA (INTERNATIONAL PHONETIC ALPHABET),

THIS STUDY WAS DESIGNED TO FIND AN EFFECTIVE GROUP-TEACHING METHOD FOR THE TRAINING OF STUDENTS IN GENERAL AMERICAN SPEECH TRANSCRIPTION, USING THE INTERNATIONAL PHONETIC ALPHABET (IPA). THE METHOD CHOSEN INCLUDED THE USE OF PROGRAMED TAPE RECORDINGS AND WORKBOOKS. THE CHAPMAN COLLEGE TEST POPULATION WAS THE CLASS IN "INTRODUCTION TO GENERAL AMERICAN PHONETICS," A TWO-UNIT SEMESTER COURSE MEETING ONCE A WEEK FOR TWO HOURS, IN WHICH IPA TRANSCRIPTION IS ORDINARILY AND PRIMARILY TAUGHT. ALL 11 STUDENTS WHO ENROLLED FINISHED THE PROGRAM, WHICH REQUIRED 26 HOURS OF CLASS (WITH NO HOMEWORK) AND INCLUDED A TOTAL OF 7,915 RESPONSE ITEMS. SCORES ON THE ENTIRE PROGRAM REVEALED THAT OVER 90 PERCENT OF THE SUBJECTS RETAINED OVER 90 PERCENT OF THE MATERIAL. THIS WAS SUPERIOR TO THE PERFORMANCE OF THE SAME INSTRUCTOR'S CLASSES IN THIS SUBJECT OVER THE PREVIOUS FOUR YEARS. THE AUTHORS CONCLUDED THAT THE PROGRAM TAUGHT AT A HIGH LEVEL OF PROFICIENCY AND THAT A GROUP AURAL-PROGRAMED METHOD OF TEACHING IPA TRANSCRIPTION HAS MERIT. THEY RECOMMENDED THAT THE PROGRAM BE REVISED TO SHORTEN COMPLETION TIME AND THAT A LARGER SCALE TEST BE CONDUCTED, WITH THE IDEA OF BROADENING THE APPLICATION OF THE PROGRAM TO LARGER CLASSES AND LESS EXPERIENCED INSTRUCTORS. (AUTHOR/AMM)

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Chapman College

Orange, California

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I. Introduction

At the time the original proposal for this project was written, there was no systematized oral-aural method for the teaching of the International Phonetic Alphabet (IPA). The situation was comparable to that of foreign language instruction before World War II.

After this grant had been awarded and work had begun, a related effort came to light with the publishing of L. S. Harms' Phonetic Transcription, A Programed Introduction (2). Harms' work was supported in part by research grants from Louisiana State University and the University of Kansas. The lack of information about this extremely important and innovative research in the traditional journals perhaps indicates a need for closer co-ordination between government, private industry, and institutional grants in regard to the publication of research in progress.

It was decided to proceed with this project because of the following differences between this study and Harms':

A. Harms' work is an introduction and not as complete a course in the IPA as was contemplated for this project.

B. Harms' work was individually programed for the student in isolation. This study is concerned with a program designed to be used with an entire class or group.

C. Harms' work was meant to be used in a language lab situation. This project was designed to develop a program that could be used in a classroom situation with one simple tape recorder.

D. There was some disagreement between Mr. Harms' methods and those contemplated for this program in regard to the use of nonsense syllables, the lack of supportive translation, the order of symbols learned, etc.

Since the International Phonetic Alphabet is the recognized and standard medium for the symbolization of speech sounds, its importance to the field of speech, and to speech correction in particular, is obvious.

However, due to antiquated teaching methods, few students manage to use the IPA as the essential tool it is. In an informal survey of fifteen-state-accredited public school speech therapists, the authors found that eleven, of 73 per cent, agreed that their training in the use of the IPA was grossly inadequate. Significantly, 86 per cent agreed that the following changes were necessary in the traditional approach:

A. Smaller classes

B. More systematic instruction

C. More useful review or "brush up" tools than current textbooks

It might be added that the IPA teacher is not motivated when he knows that the teaching skill required of him is less than that required of a first-grade teacher introducing the ABC's. He is less than happy also with the large amount of rote grading he must do. If he is perceptive, the lack of real and useful learning on the part of his students will be frustrating. Of course the students tend to feel the same way.

Little has been done to improve the teaching of the IPA since it was first introduced in 1882. Programing had not been attempted. A workbook has been published recently, and some concern is being shown toward more intelligent practice drills. However, until Harms' study and this project, the symbolization of speech sounds was taught without the sounds themselves. There were no tape recordings or phonograph records available to give the student systematized drills in transcription from life--the primary use of the IPA as a tool.

The significance of this project, the development, testing and evaluation of a programed method for the teaching of the IPA, is thus clear. Through the proved effectiveness of programed learning as developed from Skinner, and through the advantages of tape recordings in the college situation as tested by Popham, it was reasoned that it should be possible to teach IPA transcription with more speed, ease, efficiency, and thus with optimum effectiveness as contrasted with conventional techniques.

Our hypothesis was: A group method can be developed, using programed tape recordings and matching workbooks, to teach with greater effectiveness the IPA method of speech transcription to Chapman College students under normal classroom conditions.

II. Method

The system of transcription employed was the International Phonetic Alphabet as presented by John S. Kenyon and Thomas A. Knott in their Pronouncing Dictionary of American English (3).

The first step was to develop this proposed course of study according to standard programing techniques, including a statement of specific instructional objectives.

These objectives were then the basis for the actual structuring of the entire program. The program was divided into eleven sequences. The first sequence was devoted to an introduction to the IPA and to programed learning techiques--specifically those used in this program. Each sequence excepting the first was concerned with teaching approximately an equal amount of material, generally three or four symbols and the sounds they represented.

After three of the sequences were developed, they were revised on the basis of the performance of ten selected students, with each sequence given to each student individually, and then revised after each trial. According to Gilbert (1958), the finished program will then work with 98 per cent of the students in the same population. Since all of the sequences were structured the same way, the proof of the first three was considered to be valid for the remaining ten, and they were so structured.

The population selected for the test of the objectives embodied in the eleven sequences was the standard Chapman College course, "Introduction to General American Phonetics," a two-credit, one semester class in which IPA transcription is ordinarily taught, along with some speech physiology. No attempt was made to modify the class in any way. The teacher, meeting time, etc. remained as in the class schedule. All of the students in the class served as one entire sample.

This sample was under a "before and after" design, using each student as his own control. Pretest and post-test measured the amount of learning.

Although the class itself was not tampered with, the experimental program was changed to hopefully prove more successful under the specific classroom situation.

Since the class met but once a week, it was reasoned that a weekly review might prove beneficial. Thus the class was given each sequence twice, the second time as review the following week. This decision is much the same that any instructor might make with learning material to better tailor it to his classroom needs. This is one of the advantages envisioned in the development of a group program under an instructor's supervision.

The first class meeting concerned itself with individual testing and introduction to the IPA and programed learning. Because of technical difficulties, sequence one, the introduction, was unavailable, and the instructor handled this material in lecture.

With the start of the second week, work commenced with sequence two. It was stressed that attendance at each class meeting was very important to the nature of the program and that sequences would be made up as soon as possible after an unavoidable absence. It was also stated that the students would be graded on each sequence, but they would not be told how they were doing until the entire program was finished. This was in regard to a letter grade, not the actual score of correct answers in the body of the program. Each student knew exactly how well he was performing on each sequence (except tests) since the correct answer was generally given to him after his initial response.

Each class period followed the same pattern. The particular sequence forms were handed out and the presequence question filled out. When all had finished, the sequence was begun. Each sequence consisted of a written part and a tape recorded part. A test followed the sequence and consisted of a written matching and a tape recorded transcription test.

If, during the recorded parts of the sequence, a student was behind or confused, he was instructed to raise his hand, at which time the recorder was stopped and rewound to the requested point. According to the instructor, the class averaged three "stops" per two-hour session. Stapling the booklets in the upper right corner instead of the traditional upper left corner as suggested by a student (Susan), eased the mechanical situation to the point where fewer stops were needed.

The tape was stopped before the test. The written portion of the test was completed by all; then the recorded test was administered with no stops. Post-

sequence questions were then answered.

Two sequences, five and six, the start of some difficult material, stimulated the students to ask for more "prompts" to better determine if they were transcribing each item correctly. The instructor complied, writing the correct answers on the chalkboard just after the students had put their answers in their booklets. These student answers were never changed, however. Only sequences five and six were done in this way and only on their first exposures.

Several of the sequences proved to be too long and could not be finished in one class period. Their first exposure was thus incomplete. The second exposure, started at the beginning of the period, was always finished. No attempt was made to make up the unfinished part of the first exposure.

In sequence nine, ten more words (139 items) were added to the second exposure test by the instructor. He felt the original sequence test was incomplete and did not adequately cover the material in the sequence. This change was made for educational reasons and not for experimental reasons, obviously, and may be excused on the basis of an instructor's concern for the educational development of the class in his care and for which he felt responsible.

Because the program was being tested for the first time in an actual classroom situation, the need for a complete revision was recognized as mandatory. Since proper data were important to this revision process, an intensive grading procedure was followed, utilizing as many sources as were feasible.

A monitor tape was made of the first three sequence sessions as a check on the instructor's memory of what had actually occurred during the class period in regard to stops, oral questions, etc. This was termed unnecessary after the third sequence because the class was working the sequences without trouble.

Student profiles were gathered and included the following items:

A. Sex
B. Age
C. Class standing
D. Cumulative grade point average
E. SAT or other aptitude test

F. Otis Self-Administrated Test of Mental Ability, Higher Exam, Form A.
G. Survey of Study Habits and Attitudes (S.S.H.A.)
H. Academic major
I. Hearing test
J. Familiarity with the IPA
K. Familiarity with programed instruction

In addition, each student answered a pre-sequence question and several post-sequence questions during each class period. The pre-sequence question concerned the student's general well-being as defined by the student. The post-sequence questions were:

A. How do you feel you did on the sequence? (poor, good, excellent)
B. How was the timing?
C. Was the sequence easy or hard?
D. How was the audibility?
E. What about interest?
F. Suggestions for improvement.

In analyzing the results, the total number of item responses required was computed, as was the total number of word responses. These totals included the test at the end of each sequence. The total correct for each student, both in items and in words, was then found.

The tests were also computed separately, both in total items, total correct items, total words, and total correct words.

Both the first exposure and the second exposure of each sequence were computed separately in this way.

The type of item error was found for every error in every sequence (including tests) using the categories of:

A. Omission--symbol missing
B. Substitution--one symbol substituted for another
C. Addition--unnecessary symbol added
D. Blank--word missing entirely

The eleven sequences were finished before the semester was over, and the instructor continued with introductory speech physiology and some advanced work on transcription, including connected speech transcription. The remaining six hours were spent this way, plus two hours of homework. During this time six pages of a standard workbook were assigned, and one hour was spent in class on connected speech transcription (non-graded).

The instructor's test on IPA transcription was taken from a standard articulation drill book (1). It was in the form of twenty-five sentences read to the students by the instructor once slowly and twice at an average rate of speaking.

Data were gathered from this test as an indication of the preparation the program had given the students in the learning of advanced material, particularly connected speech transcription.

III. Results

In the ten sequences there were, including tests, 7,915 item (symbol) responses called for on the part of the student. The total tests called for 1,732 item responses from the testee. The program was completed by all eleven students in approximately twenty-six class-hours (no homework) over a period of thirteen weeks.

The summary statistics for the individual sequences including tests, the tests in isolation, and certain correlations are presented here in chart form. All of the summary statistics are computed from the second exposure to each sequence.

In addition, the instructor's grade scheme and class records for the four years prior to the experimental class are shown.

This represents a small part of the tabulated data, the bulk of which will be used in the revision of the experimental program.

Selected data from student profiles can be found in Appendix "D." Appendix "A" contains the program test for Sequence 11, including the correct handwritten answers. Appendix "B" is the instructor's transcription test, and Appendix "C" is a typical student test paper from the instructor's complete final test.

A. Summary Statistics

PERFORMANCE ON INDIVIDUAL SEQUENCES,
INCLUDING TESTS--SECOND EXPOSURE

(All values are expressed as proportion of items correct.)

Sequence Number	High	Low	Mean	Median
2	1.000	.886	.968	.984
3	.999	.948	.982	.987
4	.990	.891	.968	.975
5	.992	.954	.974	.968
6	.993	.928	.985	.978
7	.972	.839*	.929*	.927
8	.974	.912	.947	.955
9	.985	.959	.971	.969
10	.983	.909	.945	.947
11	.977	.885	.937	.932
Total Sequences 2-11	.981	.931	.957	.959

*If Elizabeth's scores on sequence seven are ignored, due to the fact that she was admittedly ill and on medication, the "low" and "mean" for sequence seven would be .897 and .938, respectively.

B. Summary Statistics

SEQUENCE TESTS 2-11 (SECOND EXPOSURE)
AND INSTRUCTOR'S INDEPENDENT TEST

(All values are expressed as proportion of items correct.)

Sequence Number	High	Low	Mean	Median
2	1.000	.957	.980	.978
3	.992	.920	.973	.976
4	.995	.802	.936	.962
5	1.000	.942	.971	.983
6	.978	.905	.938	.945
7	.957	.812	.898*	.928
8	.963	.854	.910	.904
9	.978	.937	.960	.963
10	.972	.793	.903	.913
11	.974	.803	.915	.926
Total Sequence Tests 2-11	.967	.874	.932	.938
Instructor's Test	.982	.897	.939	.935

*Female subject ill (see Section IV. Discussion).

C. Summary Statistics

CORRELATIONS OF INTEREST

G.P.A.	-	Total IPA*	.56
G.P.A.	-	Instructor's Test .	.42
Total IPA	-	Instructor's Test .	.86
Sequence 11 Test	-	Instructor's Test .	.83
I.Q.	-	Instructor's Test .	.71
I.Q.	-	Total IPA	.79
S.S.H.A.	-	Instructor's Test .	.44
S.S.H.A.	-	Total IPA	.56

*Tests included.

NOTE: All correlations are Spearman Rank Order Coefficients.

DESCRIPTIVE DATA ON SUBJECTS

AGE: Median Age--21
Age Range --19 - 47

EDUCATIONAL LEVEL: Sophomore - Graduate

G.P.A.	Mean:	2.646
	Median:	2.488
	Range:	2.000 - 3.551
I.Q.	Mean:	111.0
	Median:	113.0
	Range:	101 - 117

D. Summary Statistics

INSTRUCTOR'S GRADE SCHEME AND GRADE RECORDS FOR THE FOUR PRECEDING YEARS OF THE TWO UNIT CHAPMAN COLLEGE COURSE "INTRODUCTION TO GENERAL AMERICAN PHONETICS"

GRADE SCHEME
(on instructor's transcription test)

90-100% (item score) . . .	A
80-90%	B
70-80%	C
65-70%	D
Below 65%	F

Using this scheme, ten of the eleven students in the program fell into the instructor's usual "A" range on his test. The lowest score in the class was less than .3% below the A/B dividing line. The lowest score on the instructor's test represented only three correct items less than the next lowest score.

INSTRUCTOR'S GRADE RECORDS

Year	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
1962-63		1		2				2		1		1
1963-64	1			2			4			2	1	1
1964-65	1		1				2			1	1	
1965-66				2			2	1		1		1
1966-67*	2		4	1		3		1				

*IPA Project Group.

The average grade for years 1962-63 through 1965-66 is "C."

The average grade for year 1966-67 (IPA project) is "B."

IV. Discussion

The only dissimilar score on both the sequence and test summary statistics is accounted for by the subject admitting she was feeling poorly, having been in an auto accident three days before and on heavy medication for nervousness and shock. This showed up in the summary statistics for sequence seven (which includes the test) but not as markedly in the test itself, where her score was not the lowest (but still low enough to affect the mean). This is noted in the charts.

Although there is a strong relationship between performance on the instructor's transcription test and the subject's final grades, it is not an absolute one since the course grade is based on only three parts IPA transcription and one part speech physiology. Therefore, although only one student fell below the grade of "A" in the instructor's transcription test, four students received the grade of "C" in the course.

The second exposure of both the sequences and the tests was computed because all ten sequences were complete. In some cases, as noted in Section III. Method, the first exposure ran out of time and was never finished. Instead, the sequence was started again the next class meeting as the second exposure. There was little difference in terms of over-all performance between the first and the second exposure of either the sequences or the sequence tests. The data from the first and second exposure of the test for sequence eleven are typical. This test can be considered as the final for the program since it contains all of the IPA symbols learned over the complete ten-sequence program. Data are given in items (symbols) correct out of a possible 268.

Student	First Exposure	Second Exposure
Pamela	233	248
Esther	239	236
Kent	244	243
Susan	252	258
Cheryl	260	261
Azalea	241	249
Elizabeth	247	238
Elaine	249	256
Robert	236	215
Jane	235	249
Violet	241	245
TOTAL	2,677	2,698

Each subject, on the average, scored less than two additional items correct on the second exposure. This amounts to less than 1 per cent improvement. Since the tests were taken a week apart, the results probably indicate a high reliability for this particular test--in addition to the validity of using only second exposure data for evaluation of the program.

It is well to remember certain limitations of a study of this kind in an actual classroom situation since it becomes difficult to maintain control over environmental conditions for a proper experimental design. Most of these problems have been noted. However, there remains the "novelty effect" which may have been operating since the class and the instructor had never experienced programed learning before. From the comments received on the post-test questions, it would indicate that this novelty effect hurt performance as much if not more than it enhanced it. There was a great deal of frustration and anxiety at the beginning of the program, and this lasted in some form throughout the semester. This was due to the instructor maintaining that the student's class grade would depend on his performance on each sequence. It is the authors' opinion that this tension offset any novelty effect operating in the study.

The teacher's role in augmenting the success of the program is hard to assess, but certainly he would, in the authors' opinion, enhance rather than detract from the program. To what degree would have to be determined through others administering the program, preferably less experienced instructors, possibly graduate students. The program is designed to enlist the aid of the instructor in a group classroom situation, and so this is not a weakness in the design, but instead a possible source of error in assessing the effectiveness of the program. Even so, the performance of the test group was markedly superior to the classes the same instructor had in the past. Together with the no better than average ability of the group, it would seem to indicate that the higher level of performance was due to the program and not to superior students or the teaching ability of the instructor.

V. Conclusions, Implications, and Recommendations

The most important single conclusion to be drawn from this study is that the group teaching program developed for the training of students in IPA speech transcription was successful at a high level. A rule of thumb goal for programed learning is that 90 per cent of the subjects retain 90 per cent of the material covered. This program, even in rough form, achieved that level easily.

There were no visible external factors that would account for such proficiency. The descriptive data indicate the test class was composed of C+ students of lower than average college I.Q. Only one student had been exposed to phonetic transcription prior to this experience. She did somewhat better than her I.Q., G.P.A, and S.S.H.A. scores would have predicted, but it is by no means certain that her prior experience was responsible.

The correlation between the program's final test (Sequence 11 test) and the instructor's independent test is remarkable, considering the differences between the two tests, one (the program) test using a number of single words as stimuli, and the other (the instructor's) test using exhaustive connected speech as stimuli. This strongly indicates the measurement of the same material, i.e., speech transcription ability. It also indicates that the program provided a good base for advanced work in transcription--the transcription of entire sentences.

The fairly high correlation between the score achieved on the program and the I.Q. scores was to be expected in any verbal facility exercise such as this one. However, the much lower correlation between the G.P.A. and S.S.H.A. figures and the program scores would seem to indicate that success in the program does not depend on traditional means. This is easily explained in the case of the S.S.H.A. scores since the forced classroom pace of the program (and no homework) helped those students with poor study habits to maintain the same work level as the students with better study habits. In fact, of three students who scored lowest on the S.S.H.A. (20th percentile), one ranked third, one ranked fifth, and one ranked tenth in total program performance (all sequences and tests).

These same students generally have poor grade point averages as a result of their poor study habits. This might also explain the similar low correlation between

the G.P.A. figures and the program scores. Again, the pace of the program forces these students to study harder and achieve better than their prior G.P.A. performance would indicate.

All available evidence indicates that the program skews the range of achievement toward the high end. This is easily seen in Section B. Summary Statistics. Even in the case of a low of 80 per cent or below, the skew can be shown to be toward the high end since the median is much higher than the mean in those instances.

This grouping toward the high end of the scale is also evident in the instructor's independent grading, which was much higher than previously, based largely on the scores of his own transcription test. The project class as a whole was judged one entire grade higher than the average of the preceding four classes. There were no "D"s or "F"s for the first time in five years.

The success of the program appears to validate the hypotheses upon which it was constructed. It was reasoned that an aural transcription method could best be taught aurally using modern language training techniques. One of the long-standing problems in teaching speech transcription is the confusion that results between standard English spelling and the IPA symbols when the teaching method consists of nothing more than a text which relies on English spelling to communicate "sounds" to the student.

Thus the student is plagued with the error of writing silent letters because he "hears" them with his eye. In this program, as developed, the student never sees the word he transcribes. There is no opportunity to see the English spelling--he only hears the word, then transcribes it in his notebook using the IPA. The proper relationship is maintained: English is heard, IPA is seen. The tendency to transcribe "toe" as "+oe" instead of the correct "+o " is thereby greatly reduced.

The group method of teaching the IPA was shown to be effective as well as economical. The simple recorder used was faithful enough in reproduction to cause no complaints about audibility (all of the subjects scored "normal" on a standard hearing test--screened at 15db ASA). The advantage of the live teacher is recognized along with the program's forced progression, which eliminates the variables of student initiative and perseverance with homework.

Interest was maintained throughout the semester due partly to the abundance of humor ("corn") in the program. Many favorable comments were received through the post-sequence questions concerning the authors' light-hearted approach to the material. Interest was also generated by the high achievement rate typical of successful programed learning sequences.

Timing of the tape with the group did not pose a problem. Most of the sequences were considered to be timed correctly; and since the instructor could, and did, stop the recorder and "back up," the question of proper timing seems to be answered.

It is recommended that this program be completely revised to increase its efficiency in terms of the time required to complete it. Further, that a large scale test with graduate assistants be undertaken to determine if relatively inexperienced instructors can achieve comparable results with different test populations (such as larger classes). It is estimated that the time required to complete the program could be cut in half with little or no reduction in achievement, and this should be the goal of the revision. All of the data necessary have been recorded and cataloged in preparation for such a revision.

It is further observed that, generally, the speech field is not utilizing the new techniques of instruction to teach particularly that subject matter which, through neglect, has stagnated over the years into rote methods and, inevitably, poor achievement.

VI. Summary

The problem was to find a group method that would teach speech transcription with more efficiency and better results within the typical class structure than conventional methods. The method selected used programed tape recordings and individual workbooks in a group learning context. It was felt that this method could most closely approximate the desired learning skill; that is, the transcription of the spoken word into the printed script of the International Phonetic Alphabet (IPA).

The program was composed of ten sequenceswhich over a semester required twenty-six class hours and no homework to complete. The program called for a total of 7,915 item responses (individual IPA symbols) from the student. Each sequence had its own test, which included items from the preceding sequences. The last sequence test, therefore, was also a final evaluation for the entire program.

There were eleven students enrolled in the experimental class, and all finished the program. Their scores on all of the sequences, separately and together; the program tests, separately and together; and an independent instructor's test; consistently revealed that over 90 per cent of the subjects scored over 90 per cent of the correct answers. This was far better than the instructor's same classes over the previous four years.

It was concluded that the program did teach at a high level of proficiency and that an aural group programed method of teaching speech transcription has merit.

It is recommended that the program be revised with the express purpose of shortening the time required to complete it. It is further recommended that a larger scale test be run, using classes from different institutions with various instructors, including graduate students, for the purpose of broadening the application of this program beyond the Chapman College campus.

VII. References

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VIII. Appendixes

Appendix A:

TEST FOR SEQUENCE 11

Words as Heard on Tape	Correct Written Answers
1. Subterfuge	1. sʌbtrəfjuʒ
2. Regime	2. rɪʒim
3. Persuasion	3. pəsweʒən
4. Incision	4. ɪnsɪʒən
5. Glazier	5. gleʒɚ
6. Delusion	6. dɪluʒən
7. Explosion	7. ɛksploʒən
8. Erosion	8. ɛroʒən
9. Lesion	9. liʒən
10. Garage	10. gəraʒ
11. Menage	11. mɛnaʒ
12. Derision	12. dɪrɪʒən
13. Precision	13. prɪsɪʒən
14. Exposure	14. ɛkspoʒɚ
15. Illusion	15. ɪluʒən
16. Occasion	16. əkeʒən
17. Persiflage	12. pɝsɪflaʒ
18. Rouge	18. ruʒ
19. Eurasian	19. jurəʒən
20. Frazier	20. freʒɚ
21. Collision	21. kəlɪʒən

22.	Seizure	22. s i ʒ ɚ
23.	Derision	23. d ʒ ɪ ʒ ə n
24.	Whiskey	24. hw ɪ s k ɪ
25.	Whinny	25. hw ɪ n ɪ
26.	Whisker	26. hw ɪ s k ɚ
27.	Meanwhile	27. m i n hw aɪ l
28.	Bobwhite	28. b a b hw aɪ t
29.	Free-wheeling	29. f r i hw i l ɪ ŋ
30.	Buckwheat	30. b ʌ k hw i t
31.	Erstwhile	31. ɝ s t hw aɪ l
32.	Jump	32. dʒ ʌ m p
33.	How now	33. h aʊ n aʊ
34.	Ranging	34. r e n dʒ ɪ ŋ
35.	Shut up	35. ʃ ʌ t ə p
36.	Choice	36. tʃ ɔɪ s
37.	Thesaurus	37. θ ɪ s a r ɪ s
38.	Lathe	38. l e ɣ
39.	Voluptuous	39. v o l ʌ p tʃ ɯ ə s
40.	Ya jerk	40. j ə dʒ ɝ k
41.	Longitudinal	41. l a n dʒ ɪ t ɯ d ɪ n ə l
42.	Saturate	42. s æ tʃ ɾ e t
43.	Fetching	43. f ɛ tʃ ɪ ŋ
44.	Fraught	44. f r ɔ t
45.	Hook	45. h ʁ k

Appendix B:

INSTRUCTOR'S TRANSCRIPTION TEST*

(As read by the instructor)

1. She feeds the three geese. They eat peas and beans.

2. Give Dick the tin dish. It is filled with pins and rings.

3. James ate the cake. But he stayed away from the table.

4. Ted spent ten cents for eggs. He left them under the bed.

5. The black cat sat on the hat. Dan patted his back.

6. Run and get some butter. We must eat supper at once.

7. Don wanted a car. Polly wanted a doll.

8. Walk along the wall. Can you see the ball on the lawn?

9. Oh, it's cold in the snow. Let's go home by the stove.

10. Put your foot on the wood. Now look at my book.

11. Ruth had two shoes. One was blue.

12. Do you like music? A few boys do not.

13. The brown cow looked at the house. Out came a mouse.

14. I have a white kite. It can fly high in the sky.

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15. The boy saw Roy. So Roy hid his toys.

16. The girl heard a bird. Bert heard it first.

17. Father and Mother are bigger. They are older.

18. Harry read a story about a rabbit. A parrot and a bear were in the story.

19. Little girls like to play with dolls. Boys always like to play ball.

20. Jimmy moves when summer comes. Sam stays home.

. . . . . .

38. The bees are always buzzing in my ears. Their music makes me lazy.

39. While she washed the dishes the men fished. Then she looked for shells along the shore.

40. Do you like television? I usually do.

41. The child sat in the chair in the kitchen. He watched the teacher choose some matches and a piece of cheese.

42. Jimmy ate bread and jam and two oranges. He put a jar of jelly in his pocket.

Appendix C:

Typical Student Test Paper from Instructor's Final Test

The following represents the entire test, including transcription, speech physiology and phonetic theory. Instructor's comments and grade have been circled for identification.

June 5, 1967.

1. ʃi fidz ðɹ. θɹi qis ‖ ðe it piz ænd binz ‖

2. qIv dIk ðə tIn dIʃ ‖ It Iz fIld wIθ pINZ ænd rINz ‖

(-1) 3. dʒemz et ðə kek ‖ bʌt hi sted ə'we fɹɒm ðə 'te,bəl ‖

(-2) 4. ɨ ted spent ten sen@@ for eqz ‖ hi left ðem ʌndɚ ðə bed ‖

5. ðə blæk kæt sæt an ðə hæt ‖ dæn pæ.tId hIz bæk ‖

6. ɹʌn æend get sʌm 'bʌt,ɚ ‖ wi mʌst it 'sʌp,ɚ æt wʌns ‖

7. dan wantɪd ə kaɹ ‖ palɪ wantɪd ə dal ‖

8. wak ə'lan ðə wal ‖ kæn ju si ðə bal an ðə lɔn ‖

9. ɨ o Its kold In ðə sno ‖ lets qo hom baI ðə stov ‖

10. pʊt jɔɹ fʊt an ðə wʊd ‖ naɹ lʊk æt maI ... bʊk ‖

11. ɹuθ hæd tu ʃuz ‖ wʌn wʌz blue ‖

12. du ju laIk 'mjuzIk ‖ ə fju bɔIz du nat ‖

(C-2)

13. ʒɹ bɹaʊn kaɪr ˈɪrkt æt ʒɹ hɑrs ‖ ɑrt
kem ə mɑrs ‖

14. ɑɪ hæv ɐ hwɑɪt kɑɪt ‖ ɪt kæn flɑɪ
hɑɪ ɪn ʒɹ skɑɪ ‖

15. ʒɹ bɔɪ sɑ rɔɪ ‖ so rɔɪ hɪd hɪz ˈtɔɪz ‖
mˈɹzɪk meks mɛˈlɛzɪ ‖

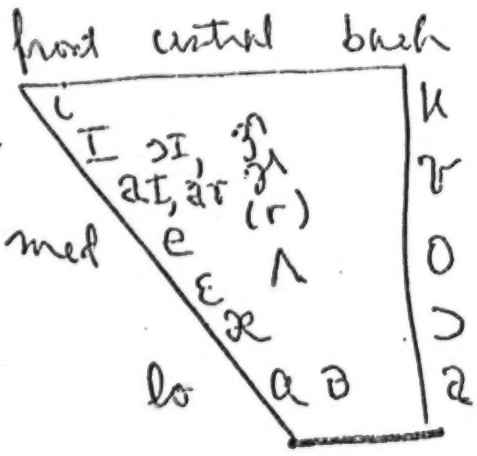
16. ʒɹ qɜɪ hɜɹd ʒɹ bɜɹd ‖ bɜɹt hɜɹd ɪt ɹɪt ‖
ɜn ʃɛ ˈɪrkt ɹɔr. ʃɛlz ə ˈlɔŋ ʃtɹɔr. ‖

17. ˈfaʃɜn ænd ˈmaʃɜn ɑr ˈbɪqˌɜ ‖ ʒe ɑrˈdɑɹn ‖
ɜn ʃɛ ˈtɛlˌəvɪʒən ‖ ɑɪ ˈjuzəˌwɛɪ ‖

18. ʒɹ ʃaɪld sɹɛt ɪn ʒɜ ʃɛr ɪn ʒə ˈkɪtʃən ‖
hɛ wɑtʃt ʒɜ tɛˈlɛvɪʒən ‖ ænd ə pɪs ɔf ˈkɛˈk

(3) 42. dʒɪnɪ et brɛd ænd dʒæm ænd tu ɔrəndʒɪz
hi ɑt ə dʒar ɑf dʒɛlɪ ɪn hɪz pakɪt

(B)



(2) a phoneme is the smallest unit of sound, a family of sounds, performing the same linguistic function.

(3) a morpheme is the smallest unit of meaning (e.g. word, prefix, suffix)

(4) stress is the overhead of voice in a word or group of words.
accent is the phonetician's instrument to describe it and transcribe it.

(5)

	bi lar.		labio-dent		interdent		longitudinal		palato alveolar		palato	velar	glottal
plosive	b	p					d	t				g k	
nasal	m						n					ŋ	
fricative			v	f	ð	θ	z	s	ʒ	ʃ			h
affricative							dʒ	tʃ					
glide	w						l		r		j		

first explanation -
plosive is initial position → air pressure caused by muscle movement.
nasal is sound produced partially by resonation of nasal cavity.
fricative is sound produced by air between 2 structures.
affricative is plosive ending up as a fricative.
glide is a semi-vowel.
labial refers to lip (bi = 2 lips)
dent " " teeth
lingual " " tongue
palate " " hard palate
alveolar " " alveolar ridge, behind teeth (upper)
velar " " soft palate
glottal " " space between the mouth + voice box.

(over)

p = unvoiced bilabial plosive.
l = voiced linguistic alveolar glide.
ʃ = unvoiced palatal alveolar fricative.
θ = unvoiced linguistic dental fricative.
s = unvoiced linguistic alveolar fricative.
h = unvoiced glottal fricative.
ʒ = voiced palatal alveolar fricative.
m = bi-labial nasal.
f = unvoiced labio-dental fricative.
v = voiced " " "

ok

(6.) Gas, a general american speech as we know it, is characterized by an almost monotone melody. It does however, change from the ~~begin~~ low beginning to high inside and the decrescendo at the end dropping off almost all together in the typical sentence. This is even quite frequent in interrogative sentences. In exclamation it tends to raise, at the end. ok

(7.) The process of making sounds, phonation, does not only involve the voice and mouth. From the bottom up then, we start with the muscles in the abdomen, the diaphram and stomach muscles, then up to the lungs & other relative factors, to the neck. In the neck, we find the voice box - a ventable horse of sound, characterized by the thyroid (front) cricoid (back) ⇐ arytenoid (insides) voice chords and the epiglottis. (roof) Sound is produced here in the pharynx, and is modified by the mouth and its parts, and also the extent of nasal resonation. In the mouth is the tongue, teeth, lips, hard & soft palates, alveolar ridge; the nasal cavity also takes place. All these factors, involve the manipulation of air and sound, and must co-ordinate with each other to perfect speech.

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Appendix D:

SELECTED DATA FROM STUDENT PROFILES

Student	Age	Class Standing	G.P.A.[1]	I.Q.[2]	S.S.H.A.[3]
Pamela	19	Soph.	2.842	115	90
Esther	20	Junior	2.060	101	20
Kent	19	Soph.	2.976	117	20
Susan	20	Junior	2.163	117	60
Cheryl	21	Senior	2.629	113	70
Azalea	46	Grad.	3.551*	113	50
Elizabeth	23	Grad.	2.000*	109	60
Elaine	19	Soph.	2.488	117	20
Robert	21	Senior	2.470	110	40
Jane	39	Grad.	3.500*	102	99
Violet	47	Grad.	2.428*	107	50

[1]Cumulated Grade Point Average on a four point scale.

[2]Otis Self-Administrated Test of Mental Ability--Higher Exam, Form A.

[3]Survey of Study Habits and Attitudes, expressed as percentile.

*Graduate work only.